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ABSTRACT

A study was conducted at the Community College of Philadelphia (CCP) to examine the course-taking patterns of 94 graduates of the associate in arts (AA) curriculum, 1,957 graduates of the association in general studies (AGS) curriculum, and 99 graduates of the associate in science (AS) curriculum. Using a computer-based approach to transcript analysis, the study identified the average number of courses in various disciplines taken by graduates of each of the three curricula. Study findings included the following: (1) an overall look at course clusterings across the three curriculum pointed to five general career directions for graduates: liberal arts transfer, teacher preparation, health preparation, chemical technology and pre-pharmacy, and engineering science; (2) the common courses taken by graduates across all three curricula included an English writing and a research course; Introduction to Psychology; Introduction to Sociology; General Biology; one of three English communication courses; and a first course in either French or Spanish; (3) AS graduates completed a number of second-level mathematics and science courses as part of their study; however, there was minimal completion of second-level general education courses in humanities or the social sciences; (4) AA graduates completed second-level language study as part of their curriculum requirement, and AGS graduates completed second-level psychology, sociology, and biology courses, most likely as a requirement for the nursing curriculum; (5) the AGS graduates were the most likely of the three groups to have completed developmental English courses; (6) a number of students in each curriculum had what appeared to be specific career goals, but there was also evidence that several engaged in career exploration in their course selections. Recommendations concerning curriculum reform and core requirements are included. (KP)

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ED 375 892

CCP

A Transcript Analysis of Graduates of Three Community College of Philadelphia Curricula Between the Years 1985 and 1992

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

Institutional Research Report #83
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October, 1994

JC 940 608

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Background: Community College of Philadelphia offers three general curricula leading to transfer to four-year baccalaureate granting institutions. Each allows students to build their own curriculum by choosing from a large number of general electives. Because of the variety of choices of courses available to students in such curricula, the College is certifying program completion by awarding the associate degree without a clear sense of the nature of the course choices of graduates. This lack of understanding presents problems for a college attempting to strengthen curricula in ways that assure a coherent learning experience for graduates. Specifically, there is a need to know more about the following issues: Can we determine the career directions students are taking by the groupings of courses they are taking? Are there popular courses commonly taken by most students? Do graduates complete second-level courses as part of their study? How many developmental courses did the graduates take as part of their program of study? Overall, did graduates' course taking patterns seem coherent?

To address these questions, this study was undertaken to analyze the course taking patterns of 2150 graduates in three curricula from 1985 to 1992. Typically, such study requires individual analysis of student transcripts. This process is usually costly and very time consuming. This study uses a computer based approach to transcript analysis that greatly facilitates the process, and allows for a much greater variety of analyses than could be practically carried out using traditional approaches to transcript analysis.

Methodology: Included in this study were 94 graduates from the Associate in Arts curriculum, 1957 graduates of the General Studies Curriculum and 99 Graduates of the Associate in Science Curriculum. These numbers represent all of the graduates in these three curricula from 1985 to 1992.

The analysis presented in this paper is the result of an iterative process. Starting with the goal of finding the average number of courses in various disciplines taken by graduates of each of the three curricula, the research ended with descriptions of subsets of clusters of courses within each curriculum based upon patterns of course taking. Information gathered at each stage of the research lead to increasingly complex attempts to identify the educational goals of the graduates. Stated differently, what began as a study to identify the courses the "average" graduate takes in each of the three curricula ended with a set of descriptions of the possible career patterns of groups of graduates within each of the curricula.

The analysis of the data in this study is but one perspective of its meaning. The authors discussed the results with a number of key persons at the College who aided in the final interpretation. Other persons reading the results could have different interpretations of the results.

Each course offered by the College was grouped into one of the following categories: English, Humanities (other than English), Social Science, Mathematics, Science, Foreign Language, Developmental, and Career (categorized by Business, Health, Humanities, Social Science, and Technology). Definitions for broad discipline categories, with the exception of English, were consistent with College crediting procedures for courses. For example, psychology, sociology, economics and history would all be classified as social sciences. English courses, although given humanities crediting, were categorized separately in this study. Individual career courses were grouped into one of the 5 categories stated above to aid in the understanding of student career interest.

THE ASSOCIATE IN ARTS GRADUATES 1985-92

The College catalogue describes the A.A. curriculum as being "for liberal arts students planning to transfer to baccalaureate programs or professional schools after CCP." An overview of the "typical" A.A. graduate is one who is prepared in foreign language study at the sophomore-level, has taken a number of introductory level social science and humanities courses required at transfer institutions, and completed one or two second-level social science and humanities courses (courses with prerequisites).

The average A.A. graduate took nine semesters (including summer sessions) to complete his or her study. Graduates had an average course completion rate of 84%. Fifteen percent (15%) of students completed a developmental course.

Overall, A.A. graduates seemed under-prepared in science with less than 30% having taken a second-level science course (predominantly in Biology). Another area of under-preparation among graduates was in mathematics as indicated by 30% of graduates having completed a remedial level math course while only 26% completed an introductory pre-calculus course.

Among the 21 most popular courses taken by graduates were 6 second-level courses, including foreign languages, English literature, mathematics and biology.

The courses unique to the A.A. graduates were the advanced French and Spanish courses, an English literature course, an art history course, and a second-level biology course.

Some of the most popular courses taken by A.A. graduates were also popular with the two other curricula graduates in this study and included: introductory psychology and sociology courses, a first course in Spanish or French, an English communications course, and an introductory biology course.

MEAN NUMBER OF COURSES COMPLETED IN DISCIPLINE/CAREER AREA BY A.A. GRADUATES

N=94

DISCIPLINE/CAREER AREA		*Mean Credits*
ENGLISH		3.5
HUMANITIES		1.4
SOCIAL SCIENCES		5.5
MATHEMATICS		2.0
SCIENCE		1.8
FOREIGN LANGUAGE		3.3
CAREER COURSES		3.0
Humanities	0.7	
Social Science	0.6	
Health	0.1	
Business	1.5	
Technical	0.1	
COURSES TRANSFERRED FROM OTHER COLLEGES		1.2
DEVELOPMENTAL		0.3
TOTAL		**22.0**
Mean Semesters Attended	9	
Course Completion Rate	84%	

TWENTY-ONE MOST FREQUENTLY COMPLETED COURSES AMONG A.A. GRADUATES

Engl 102	97%
Engl 101	90
Span or Fren 201	81
Psyc 101	79
Span or Fren 202	78
Soc 101	74
Span or Fren 102	71
Span or Fren 101	67
One history course	66
Engl 114,115, or 116	58
Math 117	58
Biol 101	56
Engl 208	35
Art 103	33
Math 116	30
Psyc 105	28
Phil 101	27
Art 104	26
Math 161	26
Biol 102	24
Anth 101	24

A closer look at the course cluster for A.A. graduates using cluster analysis suggests six different groupings. The first is a traditional academic core of courses for transfer at the most challenging level offered by the College including second-level courses. For example, this grouping included college-level mathematics and second-level courses in English and the social and behavioral sciences.

The second cluster is focused on history courses. It indicates that a number of graduates had a special interest in history as part of their study.

The third cluster is a more general distribution of courses including a variety of electives at the introductory level. Except for the sophomore-level language courses, the courses in this cluster were at the introductory level. The cluster also included some developmental courses in mathematics and English.

The fourth grouping represents a number of business courses. This may represent a small group of graduates who were focused on business. What is unknown is whether they took these courses and decided not to pursue business as a career, or they decided to use the A.A. curriculum as an alternate route to business studies at the transfer institution.

The fifth group consists of a cluster of courses typically taken by students interested in teacher education. One possible explanation for this is that graduates used the A.A. as an alternate to the Pre-Education curriculum because of their desire to take more foreign language than was available through the Pre-Education curriculum.

The sixth group identifies a cluster of courses typically taken by persons preparing for careers in health. Graduates taking these courses either were not accepted into a CCP allied health program or were preparing to transfer to another institution in this field.

CLUSTER ANALYSIS OF COURSE TAKING PATTERNS FOR ASSOCIATE IN ARTS GRADUATES.

FREN201	
FREN202	
FREN101	
FREN102	
BIOL101	*1 (Traditional academic courses for transfer)*
BIOL102	
MATH151	
MATH152	
ENGL208	
ANTH112	
ART103	
PSYC105	
PSYC205	
SOC212	
HIST121	
PSYC201	
ANTH101	
HIST122	*2 (History)*
PHIL101	
HIST101	
HIST102	
SPAN101	
SPAN102	
SPAN201	
SPAN202	
MATH117	
GEOG101	*3 (More general courses for transfer)*
MATH118	
ENGL090	
MATH116	
ENGL101	
ENGL102	
ENGL116	
ENGL114	
OA110	
ENGL205	
POLS111	
PSYC101	
MATH161	
MATH162	
ECON181	*4 (Business)*
MNGT141	
ACCT101	
DP101	
MNGT121	
ART104	
PHIL251	
ENGL115	*5 (Teacher Preparation)*
PHIL111	
EDUC201	
BIOL109	
BIOL110	
CHEM110	*6 (Health Career Preparation)*
DP103	
SOC101	
POLS101	

THE ASSOCIATE IN GENERAL STUDIES GRADUATE 1985 to 92

The Associate in General Studies Program is described in the College Catalogue as being for " those students who want the flexibility of designing a curriculum to meet individual career and/or transfer goals." A curriculum that is tailored to the individual needs of students makes understanding the collective experience of graduates from the curriculum complex. An overview of the "typical" A.G.S. graduate is one who has taken the basic number of humanities, social science, mathematics and science courses. Relatively few foreign language courses were completed be the A.G.S. students (especially in comparison with the A.A. graduates). In addition, they were much more likely to have completed career courses, especially in business.

The average A.G.S. graduate took 11 semesters to graduate (including summer sessions), taking slightly over 22 courses. Graduates had an average course completion rate of 78% which was much lower than the 84% completion rate for the A.A. graduate and slighly lower than the 80% completion rate for the A.S. graduate.

A.G.S. graduates completed the usual array of introductory social science and humanities electives. Their completion of mathematics was at the lowest level of the three curricula examined, with less than 20% of graduates completing a calculus course and 38% completing the remedial mathematics course Math 116. Exposure to foreign languages was limited to the beginning first-semester level. Science was limited to a first Biology course, or, in the case of persons interested in the health professions, anatomy and physiology (Biol 109/110). A number of graduates completed courses in business, indicating a possible optional curriculum direction for persons interested in business.

MEAN NUMBER OF COURSES COMPLETED IN DISCIPLINE/CAREER AREA BY A.G.S. GRADUATES

N=1957

DISCIPLINE/CAREER AREA		*Mean Credits*
ENGLISH		3.7
HUMANITIES		1.2
SOCIAL SCIENCES		5.3
MATHEMATICS		2.0
SCIENCE		2.7
FOREIGN LANGUAGE		0.6
CAREER COURSES		5.3
Humanities	0.5	
Social Science	0.8	
Health	0.6	
Business	3.3	
Technical	0.1	
COURSES TRANSFERRED FROM OTHER COLLEGES		1.0
DEVELOPMENTAL		0.4
TOTAL		**22.2**

Mean Semesters Attended	11
Course Completion Rate	78%

TWENTY-ONE MOST FREQUENTLY COMPLETED COURSES AMONG A.G.S. GRADUATES

Engl 114, 115, OR 116	93%
Engl 102	93
Psyc 101	89
Engl 101	88
Soc 101	76
Math 117	65
Biol 101	59
One history course	52
Psyc 105	35
Biol 109	38
Math 116	38
Span or Fren 101	35
Mngt 121	33
Biol 110	32
Phil 101	31
Econ 181	31
Acct 101	28
Art 103	24
Soc 212	23
DP101	22
OA110	21

A cluster analysis of the course-taking patterns of the A.G.S. graduates produced seven clusters. The first is a cluster of courses related to health career preparation. This cluster probably represents graduates who took the biology and chemistry courses required of persons entering many of the allied health curricula.

The second cluster of courses is identified as being taken by graduates who completed advanced-level social science courses and science requirements most likely for transfer. The completion of three second-level social science courses could point to an interest among graduates in careers related to the social and behavioral sciences.

The third cluster remains undefined because it did not seem to fit an identifiable cohort of graduates associated with the courses.

The fourth cluster of courses can be assumed to have been taken by graduates interested in business. It could be hypothesized that the business curricula in place at the time of this study were not meeting the needs of the students.(A new business transfer curriculum is now in place.) Thus, graduates completed their study in the A.G.S. program as a viable alternative.

The fifth cluster of courses were those commonly taken by persons enrolled in a specific program of study, the Cooperative Learning Project, that offers both core courses and special support services.

The sixth cluster of courses seem to be those taken by graduates who were preparing for transfer in teacher education. Although the College offers such a program of study (which has recently been revised to meet transfer needs of students), it was probably not meeting the needs of students seeking transfer to continue their teacher education at four year schools.

The seventh cluster of courses were foundation general education courses typically taken in preparation for transfer.

CLUSTER ANALYSIS OF COURSE TAKING PATTERNS FOR ASSOCIATE IN GENERAL STUDIES GRADUATES

BIOL109		
BIOL110		
BIOL241		
PSYC105	1	*(Health Career Preparation)*
CHEM110		
MRT105		
ENGL116		
BIOL101		
BIOL102		
CHEM101	2	*(Second-level Social Science)*
PSYC201		
PSYC205		
SOC101		
SOC212		
CHEM121		
MATH161	3	*(Undefined)*
ENGL114		
OA110		
ENGL100		
MNGT121		
MNGT141		
MNGT111		
DP101		
ECON181	4	*(Business)*
ECON182		
ACCT101		
ACCT102		
MNGT161		
ECON112		
DP106		
ENGL101		
ENGL102		
PSYC101		
ENGL090	5	*(Preparatory Study)*
MATH116		
MATH117		
SPAN101		
SPAN102		
HIST101		
HIST102	6	*(Teacher Training)*
EDUC201		
GEOG101		
MATH151		
HIST121		
HIST122		
ART103		
ART104		
PHIL251		
PHIL101		
ENGL208		
DP103		
MATH118	7	*(General Student)*
ENGL115		
POLS101		
ANTH112		
POLS111		
ANTH101		

THE ASSOCIATE IN SCIENCE GRADUATES 1985 to 92

The Associate in Science Curriculum is defined as the appropriate program of study for students wishing to transfer in fields related to biological and physical sciences or in pre-professional programs such as pre-pharmacy, pre-medical or pre-dental. It requires the completion of second-level calculus, a number of lab sciences to be selected by the student, two social science and two humanities electives, two English writing courses, and four general electives.

The typical graduate responds to these requirements by taking several preliminary mathematics courses in preparation for calculus, a number of lab science courses with chemistry being the most popular, second-level courses in a lab science, introductory sociology and psychology courses, and introductory English communications and foreign language courses to meet the humanities requirement.

The average A.S. graduate completed work in 10 semesters (including summer sessions). They had an average course completion rate of 80% and transferred an average of slightly less than 2 courses from another college. The typical graduate did not complete a developmental course.

The 21 most popular courses taken by graduates were dominated by higher-level mathematics and chemistry. In addition, graduates of the A.S. curriculum took a number of Physics courses that are generally not taken by students in non-science transfer curricula, thus giving support to the stated purpose of the curriculum to prepare students for transfer in careers related to science and mathematics.

A large number of science courses were taken by the A.S. graduates, leaving less room in their program of study for social science and humanities course. As indicated above, all of these social science and humanities courses were at the introductory level.

MEAN NUMBER OF COURSES COMPLETED IN DISCIPLINE/CAREER AREA BY A.S. GRADUATES

N=99

DISCIPLINE/CAREER AREA		*Mean Credits*
ENGLISH		2.4
HUMANITIES		0.7
SOCIAL SCIENCES		2.8
MATHEMATICS		3.0
SCIENCE		8.0
FOREIGN LANGUAGE		0.9
CAREER COURSES		3.3
Humanities	0.4	
Social Science	0.0	
Health	0.4	
Business	1.1	
Technical	1.4	
COURSES TRANSFERRED FROM OTHER COLLEGES		1.7
DEVELOPMENTAL		0.2
TOTAL		**23.0**

Mean Semesters Attended	10
Course Completion Rate	80%

TWENTY-ONE MOST FREQUENTLY COMPLETED COURSES AMONG A.S. GRADUATES

Math/Engineering 172	94%
Engl 102	93
Chem 121	92
Chem 122	85
Math/Engr 171	83
Engl 101	78
Psyc 101	70
Soc 101	55
Math/engr 161	55
Math/Engr 162	53
Chem 221	53
Chem 222	52
Biol 109	46
Engl 114, 115 or 116	43
Biol 101	42
Econ 181	42
Span or Fren 101	42
Biol 110	40
Physics 140	35
Biol 126	33
Physics 111 or 112	33

The Associate in Science graduate course-taking patterns were analyzed again using cluster analysis. This analysis suggests five career interest groups and a group of students who engaged in preparatory study at the College. The first cluster consisted of courses taken by graduates interested in transferring into fields related to chemical technology and pharmacy.

The second course grouping included those taken by graduates who would be expected to have an interest in studying in fields related to the biological sciences. The courses included botany, zoology and genetics. There was also an introductory year of French, suggesting graduates taking these courses were meeting transfer institution requirements for language.

The third grouping included courses taken by graduates interested in majoring in engineering at transfer institutions. Since the College also has an Engineering Science curriculum, it appears that a number of graduates used this alternative road to meet the specific course requirements of transfer institutions that may not have been available in CCP's Engineering Science curriculum.

The fourth grouping of courses were those typically taken by graduates interested in health careers. Included in this cluster was one year of Spanish, which may be an indicator that the graduates were interested in working in clinical settings where Spanish would be useful.

The fifth cluster included courses with a more general science focus, perhaps taken by graduates with an interest in mathematics.

The sixth grouping of courses where typically taken by the College's Cooperative Learning Project, indicating a number of graduates began their study in this program.

CLUSTER ANALYSIS OF COURSE TAKING PATTERNS FOR ASSOCIATE IN SCIENCE GRADUATES

CHEM221		
CHEM222		
CHEM213	1	*(Chemical Technology & Pre-Pharmacy)*
CHEM214		
CHEM217		
DP106		
ART103		
PSYC205		
ANTH101		
BIOL211		
FREN101		
FREN102		
BIOL125	2	*(Biological Sciences)*
BIOL126		
PHYS111		
PHYS112		
ECON181		
ECON182		
ENGR161		
ENGR162		
ENGR171		
ENGR172	3	*(Engineering)*
ENGR271		
PHYS140		
PHYS241		
CHEM121		
CHEM122		
CHEM110		
MATH117		
PSYC105		
BIOL109		
BIOL110	4	*(Health Interest)*
BIOL241		
ENGL114		
SPAN101		
SPAN102		
BIOL101		
BIOL102		
CHEM212		
GEOG101		
MATH162		
MATH171		
MATH161	5	*(General Student)*
MATH172		
SOC101		
HIST101		
PHIL101		
PHYS105		
ENGL115		
MUS101		
ENGL101	6	*(Preparatory Study)*
ENGL102		
PSYC101		
ENGL090		
ENGL116		

CONCLUSIONS DRAWN FROM THE STUDY

The purpose of this study was to examine student course taking patterns in three curricula that allow students wide variations in the courses they select. Doing so informs the collective picture of the curricula that students build when allowed to do so. Studying student course taking behavior is only one window into an examination of the educational experience. It is helpful for educational planners in attempting to answer some of the curriculum questions, but certainly does not address all of the important issues. The analysis of the data from this study is focused on attempting to answer the following questions:

1. What career assumptions can be made from student course-taking patterns?

An overall look at course clustering across the three curricula points to five general career directions for the graduates. In addition, there is another cluster that indicates a number of graduates started their study by taking developmental courses and/or were enrolled in the College's Cooperative Learning Project. The five career clusters are as follows:

Liberal Arts Transfer. Both the A.G.S. and the A.A. curricula had clusters of courses that indicate graduates were taking typical humanities and social science courses for transfer. There were several levels of difficulty; one cluster including second-level courses and a second including mostly first level courses. Graduates in the A.A. curriculum were distinguished by their completion of a foreign language at the sophomore-level, while the A.G.S. graduate typically completed little or no foreign language study.

Teacher Preparation. Both the A.G.S. and the A.S. curricula had a cluster of courses taken by persons interested in teacher preparation. The Education 201 course is a key to this cluster. However, since this course was not among the 21 most popular courses in either curriculum, it can be assumed this represented a career interest of small numbers of graduates in these two curricula. (Additional data not presented in this report show roughly 13 to 16 % of A.G.S. and/or A.S. graduates with such an interest.)

Health Preparation. There was a cluster in each of the three curricula that indicated graduates were taking courses in preparation for health careers. Data from the 21 most frequently taken courses indicates that graduates of the A.G.S. and A.S. curricula were interested in health professions in fairly large numbers. The completion rate of Biology 109 and 110 was the indicator of this.

Chemical Technology and Pre-Pharmacy. There was a cluster of courses in the A.S. program that focused on advanced chemistry. This indicates that a number of Graduates had chosen the A.S. degree program because of an interest in transferring to a four year college, rather than the Chemical Technology Curriculum that prepares students for direct employment. In addition, this cluster of courses is also recommended by academic advisors to students interested in a career in pharmacy.

Engineering Science. Another cluster of courses in the A.S. Curriculum represented courses taken by students interested in engineering. Graduates who chose the A.S. curriculum instead of the College's Engineering Science Curriculum

did so because they intended to transfer to colleges or universities that did not accept some of the courses in the Engineering Science Curriculum. In this way, they were able to tailor their courses to the requirements of specific transfer institutions.

2. *What are the popular courses commonly taken by most students?*

The common courses taken by graduates across all three curricula included an English writing and a research course (English 101 and 102), Introduction to Psychology, Introduction to Sociology, General Biology, one of three English communications courses, and the first course in either French or Spanish. The A.A. and A.G.S. graduates also commonly completed a course in history and a course in algebra.

Beyond the courses in common were differences in what constituted the most popular courses taken by graduates in each of the three curricula. The A.A. graduates far exceeded the other two curricula in the completion of foreign language courses at the sophomore-level. They also completed more humanities courses than the other graduates. The A.G.S. graduates completed a number of business courses as part of their study, a further indication of an interest in business as a career. The A.S. graduates completed far more advanced mathematics and science courses than the A.A. and A.G.S. curricula graduates.

3. *Do graduates complete second-level courses as part of their study?*

Graduates of the A.S. curriculum completed a number of second-level mathematics and science courses as part of their study. However, there was minimal completion of second-level general education courses in humanities or the social sciences. Graduates of the A.A. curriculum completed second-level language study as part of their curriculum requirement. In addition, a second-level English course, one psychology course and a second semester biology course were among the 21 most frequently completed courses among the A.A. graduates. Graduates of the A.G.S. curriculum completed second-level psychology and sociology courses most likely to meet a requirement in the nursing curriculum. In addition, they completed a second-level biology course probably for the same purpose. No other second-level courses were among the 21 most frequently completed courses by the A.G.S. graduates.

In summary, the A.S. graduates completed second-level courses in areas where they were required to do so by the curriculum structure; namely mathematics and science. The A.S. graduates completed second-level courses in foreign language because of the curriculum requirement. In addition, they completed several other such courses by personal choice. A.G.S. graduates completed second-level courses most likely to meet career goals in the health sciences, rather than as part of a general education experience.

4. *How many developmental courses did the graduates take as part of their program of study?*

The A.G.S. graduates were the most likely of the three groups of graduates to have completed developmental English courses. Seventeen percent (17%) of the A.G.S. graduates completed one such course and another 7% completed two or more developmental English courses. Thirty eight percent (38%) of the A.G.S. graduates completed the pre-college Math 116 course.

The A.A. graduates completed fewer developmental English courses than the A.G.S. graduates. Fourteen percent (14%) completed one course and an additional 5% completed two or more courses. Thirty percent (30%) of the A.A. graduates completed Math 116.

The A.S. graduates completed the fewest developmental English courses among the three groups. Nine percent (9%) completed one course and an additional 6% completed two or more courses. Unlike the A.G.S. and the A.A. graduates who had roughly one-third of their numbers completing pre-college Math 116, only 2% of A.S. graduates completed this course.

Overall, the data indicates that developmental English was a factor in the education of 15 to 25% of the graduates, depending on the curriculum. For most of these graduates, the developmental English taken was at course levels that were immediately prior to college-level English writing. The taking of pre-college mathematics was an even more frequent occurrence among the graduates of the A.A. and A.G.S. curriculum; while not a factor at all for the A.S. graduates. Subsequent conversations with the chair of the mathematics department leave open the question as to whether graduates took this course because of educational need or simply to meet the mathematics-science requirement in the A.A. and A.G.S. curricula as easily as possible.

5. *Overall, were graduate course taking patterns coherent?*

The data indicate there are several answers to this question. A number of students in each of the three curricula had what appeared to be specific career goals. For example, a number of graduates in each of the three curricula were taking coursework in preparation for careers in health.

There is also evidence that a number of graduates had been engaged in career exploration in their selection of courses. This was especially true in the A.G.S. curriculum where the average number of career courses taken was higher than the other two curricula. This type of exploration "trades off" a more coherent general education experience for a better understanding of career choices.

Along with career exploration, it appeared that graduates were enrolled in one of the three curricula as an alternative to completing other more structured curricula such as business, engineering or pre-education. In such cases, graduates were most likely planing coherent courses of study for transfer to specific institutions and found the flexibility of the A.A., the A.G.S. and to a lesser extent the A.S. curriculum, more useful for their purposes.

There were also graduates who seemed to have taken courses for completion of the degree without consideration of the breadth and depth of courses traditionally considered necessary for a foundation to transfer and completion of the baccalaureate degree. This is especially apparent in the A.G.S. program. One reason for this was that a number of graduates in the A.G.S. curriculum changed career direction and combined two different curriculum directions into one degree. This did not allow enough time for sophomore-level courses. Another reason may have been that a number of graduates preferred the flexibility of course selection offered by the A.G.S. curriculum.

A large number of the A.A. and the A.G.S. graduates lacked the coherent educational experience in science and mathematics normally expected of students completing the sophomore-level of study. Roughly 20% of these graduates never completed a science course. In addition, large numbers of the graduates limited their study of mathematics to the lowest level of algebra.

RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT

Prepared by Aram L. Terzian

1. Reconsider the A.A. and the A.G.S. Curricula

The major difference between the A.A. and the A.G.S. curricula is the requirement for a foreign language in the former. The data from this study indicates that except for this difference, graduates of both curricula shared a number of common course completion patterns. Each curriculum had career clusters in health, business, education, and general liberal arts. In addition, 13 of the 21 most commonly completed courses were similar for the two curricula. The differences were among the foreign language courses, math and science, and a second-level English literature course.

The large number of graduates in the A.G.S. curriculum (1957) compared with the A.A. curriculum (94), strongly indicates that the A.G.S. graduates were avoiding the foreign language requirements of the A.A. curriculum. Unfortunately, these same graduates are being awarded the A.G.S. degree instead of the A.A. degree when the only substantive difference was completion of foreign language. Curriculum builders at the College should consider the combining of these two curricula by eliminating sophomore-level foreign language study as a requirement. A new combined curriculum would allow students to take concentrations in foreign language, international study or some other combination of study that could meet contemporary liberal arts requirements needed for transfer to four-year colleges in the broad career categories identified in this report.

2. Strengthen core requirements to assure students have study in depth and breadth.

Both the A.A. and the A.G.S. curriculum allow students to select many of their courses as general electives. The data from this study indicates several weaknesses in the overall course taking patterns of the graduates from these two curricula that need to be considered by curriculum builders. The first weakness is that 10% of the students in each of these programs did not complete one mathematics course. In addition, among the A.G.S. students completing a mathematics course, their highest level of achievement was at the beginning algebra level. It is being recommended that the mathematics requirements need to be strengthened in both curricula. It is further recommended that careful consideration be given to the role courses in statistics can play in the educational development of students as an alternative to traditional higher level courses in mathematics.

Twenty percent (20%) of the A.A. and A.G.S. graduates did not complete one science course. The lack of a science course requirement in these two curricula seems inappropriate. The question of whether it is wise or meaningful to require more than one science course is an open question that should be discussed further.

The lack of second-level courses in disciplines seems to be another weakness in both the A.A., and more markedly, the A.G.S. curricula. This runs counter to the nationwide call in higher education for students to have experience with study in depth as an important part of a coherent educational experience. This lack of second-level course-taking needs to be addressed in reforming curricula.

3. Reconsider the business, education, and engineering science curricula.

The data from this study point to a large number of graduates who were enrolled in one of the three curricula with an interest in business, chemical technology, education or

engineering science curricula. It is reasonable to assume that a number of the graduates decided to "opt-out" of the traditional curricula that serve these career interests in favor of the more open-ended course requirements of the A.A., A.G.S. and A.S. curricula. Careful examination of the requirements of the four career curricula need to be made to assure they are meeting the needs of students, especially when students are using these curricula for transfer to four year colleges.

4. Allow enough room in each curriculum for student career exploration.

The data clearly indicate that graduates of the A.A. and A.G.S. curricula took a number of career courses as part of their study. Career exploration and the right to change one's mind about careers have their place in higher education and should be valued. In reforming general curricula such as the three studied in this paper, it is important to allow enough space for career exploration without penalty. On the other hand, curriculum builders should carefully consider the appropriateness of awarding a degree to students who complete one half of two programs, or who complete the A.G.S. curriculum in order to avoid important courses in other curricula.